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Southwestern MEDICINE

VOL. XXXVII SEPTEMBER, 1956 No. 9

CURRENT THERAPY

Tranquilizing Drugs

By Jack A. Bernard, M. D., El Paso

The tranquilizing drugs, designated Ataraxics, from the Greek word "ataraxy" meaning freedom from confusion or peace of mind, are a new class of agents having the characteristics of sedatives but not the same end effects nor do they behave like true sedatives.

They are said to act by blocking subcortical areas and they bring about a reduction in tension or excitement to produce a calm or tranquil state. Large doses result in sleep. These substances include: Meprobamate (Miltown and Equanil), the phenothiazines chlorpromazine (Thorazine) and promazine (Sparine), the azacycolenol Frenquel and the crystalline derivatives of R. Serpentina.

Meprobamate which is Miltown and Equanil, is a derivative of mephenesin (Tolserol) and has three pharmacological properties: A muscle relaxant action, an anticonvulsant action, and a taming effect (observed in experimental monkeys). Vital functions such as pulse rate, blood pressure, temperature, and intestinal mobility are not affected.

Dosage

Usual dosage is one 400 mg. tablet three or four times a day although higher dosages may be given. Toxicity is extremely low as some patients have taken as high as 50 to 100 tablets and have recovered. Side reactions include allergic angioneurotic edema and fever. Drowsiness may also occur depending upon the dosage.

Meprobamate has been found to be most successful in the anxiety and tension states and seems more effective than the barbiturates in many instances. It is very helpful also in tension headaches, premenstrual stress and insomnia.

It has been reported to be effective in the control of petit mal epilepsy, and is said to be less effective than Tridione, but as effective as Paradione, and is superior to other anti-petit mal drugs. It was not found to be of value in grand mal epilepsy. Its absence of toxic effects may make it a very important drug in the control of petit mal epilepsy.

Phenothiazines

The phenothiazines, chlorpromazine and promazine (Thorazine and Sparine) are preferred in the management of the acutely disturbed patient. The toxic reactions of chlorpromazine have not yet been reported from promazine. No severe circulatory collapse has been reported from promazine and the other side reactions such as tachycardia and jaundice also are not yet reported.

Chlorpromazine may produce an obstructive type of jaundice which usually clears upon cessation of the drug, but in some patients the jaundice may persist for months. Agranulocytosis has been reported in a few cases from the use of chlorpromazine.

The phenothiazine drugs have their greatest usefulness in the acute alcoholic, acute psychotic and the drug addict. Promazine has also been used in obstetrics to shorten labor and enhance the sedation of other drugs; no ill effects were observed on the new born infant.

Delusions and Hallucinations

Merrell has introduced Frenquel, which is said to be indicated for treatment of acute schizophrenic reactions and certain toxic psychoses, particularly where delusions and hallucinations have been the prominent symptoms; it occasionally was of value in some cases of senile hallucinatory states.

It is said to be without side effects and the patients are calm without being sedated, producing a cooperative state. The dosage is 20 mg. three times daily by mouth. Further reports and experiences are awaited.

Reserpine is also being used successfully for anxiety tension states as well as for hypertension. Complications include nasal stuffiness, mental depression; higher doses may produce a state of Parkinsonism Reports of mental depressions in patients on this drug are becoming more numerous and this is a real and serious hazard that must be kept in mind.

True Clinical Value

Finally, it has been said that new drugs usually pass through three states before their clinical usefulness is established. During the first stage they are received with enthusiastic and often uncritical acceptance for a variety of conditions. During the second phase, a reversal of judgement frequently occurs and the value of the drug is doubted by many. Eventually, during the last phase, the true clinical value of the product is established. So be it with the ataraxics.

Edited by Andrew M. Babey, M. D., Las Cruces, N. M.

APHORISMS and MEMORABILIA

Miscellaneous Truths and Concepts

1. "It has been suggested that the development of pronounced intraventricular block is a clue to the imminence of these complications. Occasionally one will be justified in proceeding with this therapy in spite of such a development. It has been our practice, where the gravity of the situation warrants, to proceed cautiously with quinidine or Pronestyl despite the development of pronounced intraventricular block since the drug may yet abolish the arrhythmia." Harold D. Levine, Samuel A. Levine, *"Management of Cardiac Emergencies";* The Medical Clinics of North America; July 1953, p. 963.

2. "The other common cause of sudden, severe abdominal pain is perforation of a viscus, which as a general rule, is preceded by discomfort of some sort, suggesting the development of a localized process. Even in the usual perforated duodenal ulcer one can almost always find, on careful questioning, that there were antecedent symptoms suggesting activity of the ulcer." Dr. John B. McKittrick, *"Case Records of Mass. Gen. Hosp.";* New England Journal of Medicine; May 26, 1955, p. 915.

3. "It has been my brief experience that appendicitis is seldom typical and usually presents itself as a variation on the classic theme. "Dr. McKittrick, *loc. cit.,* p. 915.

Factors Listed

4. "The virulence of the organisms, the presence or absence of vascular occlusion in the appendix and the location of the organ itself — behind the cecum, in the pelvis, amongst loops of small bowel, free against the anterior parietal peritoneum and so forth — are some of the factors that influence the development of the process and the findings in any given case." Dr. McKittrick, *loc. cit.,* p. 915.

5. "Usually, when appendicitis starts in such a dramatic and severe fashion, it means that the appendix has been invaded by a very virulent organism that rapidly dissolves the organ and that gangrene and perforation develop very quickly. Under these circumstances it is not common to find a localized abscess, but rather a spreading peritonitis." Dr. McKittrick, *loc. cit.,* p. 915.

6. "It is surprising how much blood may be in the peritoneum without producing pain, tenderness or discomfort." Dr. McKittrick, *loc. cit.,* p. 915.

7. "This patient brought out a point that the older surgeons used to make about appendicitis. In the inflammatory type of disease, without primary obstruction such as might be caused by a fecalith, early vomiting is rare, and nausea is not prominent. The process is more leisurely." Dr. Gordon A. Donaldson, *loc. cit.,* p. 916.

Clotting Defects

8. "In the group of acquired clotting defects there is a haemophilia-like state occurring in females which is due to an anticoagulant in the blood, developed during or after pregnancy, perhaps as an immune reaction. An acute fibrinogen deficiency may also occur with disastrous rapidity in some cases of premature detachment of the placenta, with uncontrollable uterine and sometimes generalized bleeding. It is due to the intravascular entry of placental fragments which cause the removal of fibrinogen from the circulating blood." R. G. MacFarlane, *"The Bleeder";* British Medical Journal; April 30, 1955, p. 1080.

9. "The most dangerous site for tissue bleeding is into the tongue and throat, because any swelling here interferes with the airway, sometimes with devasting rapidity. As soon as it is diagnosed arrangements should be made for the immediate transfer of the patient to hospital, where facilities are available to pass an endotracheal tube." R. G. MacFarlane, *loc. cit.,* p. 1082.

10. "In haemophilia the blood defect can be temporarily corrected by transfusions of several pints of normal blood or plasma, which must be given within a few hours of its collection from the donor, as the active factor is very labile." R. G. MacFarlane, *loc. cit.,* p. 1082.

Causes of Stroke

11. "When a young adult has an unexpected stroke it is proper to search diligently for such causes as tumor, congenital vascular abnormalities, blood disease, embolic disorders, syphilis, and polyarteritis nodosa." *The Lancet,* May 21, 1955, p. 1065.

12. "The theory of the modern kitchen and the labour-saving device is that it suddenly launched women on to new seas of opportunity, oceans of rippling, sun-flecked leisure. And there is no doubt at all that it has absorbed, via the electric motor, a great deal of absurd drudgery which no human being ought to have to do at all. But it now appears that women still have to decide to use wisely the leisure they have gained. And the Senate report seems to say that there is still no electronic escape from the time that should be given to children; and no substitute for the maybe seemingly lazy contact with one's own children. It is not the male tyrant any longer, or the educator, or the intellectual who insists that woman's place is in the home. It is now, heaven help us, the psychiatrist." Alistair Cooke, *Listener,* March 31, 1955, p. 561.

(To be continued)

"Pointers"

From the Case Records of Massachusetts General Hospital 1951*

1. "This extension along the anterior surface without involvement of the intervertebral disks is quite characteristic of tuberculosis, as has been described well by Compere. Involvement of the disk is a very late manifestation in tuberculosis and is not a direct extension from the vertebra, unlike pyogenic infections, in which the disk is less resistant to destruction." Jan. 4, 1951; p. 26.

2. "In an older person one is more likely to find a mediastinal goiter that does not move on swallowing. With increasing age the attachment of the goiter to the larynx becomes more tenuous." *loc. cit.;* p. 28.

3. "We occasionally see patients in severe diabetic acidosis who have little or no ketone bodies in the urine, when there have been large amounts of ketones in the blood, as indicated by a simple test that uses acetone powder with serum several times diluted. It usually occurs with severe oliguria, and I have supposed it meant inability of the kidneys to excrete ketones." *loc. cit.;* p. 103.

4. "Unlike the sexual disturbances in diabetic women, which appear to have a hormonal basis, the sexual disorders of diabetic men are primarily neurologic in origin." *loc. cit.;* p. 107.

Call For Bed Pan

5. "Serious pulmonary embolism is often associated with the feeling of abdominal distention and a call for the bedpan." *loc. cit.;* p. 228.

6. "Soon after the onset of a dissecting aneurysm of the aorta the patient may show a normal hemoglobin and white count." A composite; *loc. cit.;* p. 228.

7. "In about 100 cases of metastatic disease to the lung about 20 per cent involved the bronchus; in about 6 or 7 of those we could actually see tumor within the bronchus. This is unusual in carcinoma and more common in sarcomas. What probably happens is that there is metastasis to the parenchyma or to a lymph node, which then invades the bronchial wall." *loc. cit.;* p. 232.

8. "Pregnancy tests are negative in about 25 per cent of cases of ectopic pregnancy." *loc. cit.;* p. 376.

Aspiration Biopsy

9. " Aspiration biopsy of vertebral bodies is relatively safe and in some cases is a satisfactory way of making a diagnosis, but the anatomical location of the lesion is most important. From the ninth dorsal vertebra distally, the aspiration can be made with relative safety; from the ninth up to and including the first dorsal vertebra, it is a procedure that should be undertaken only with extreme caution, and perhaps should not be undertaken at all." *loc. cit.;* p. 483.

10. "A hypernephroma may be causing obvious metastatic bone disease yet because of its location and size be undiscovered by intravenous and retrograde pyelogram." A Composite; *loc. cit.;* p. 484.

11. "My department (pathology) is usually notably reluctant to try to name the primary site of metastatic tumor; it is very seldom that we can be persuaded to commit ourselves." *loc. cit.,* p. 484.

12. "Although we believe that after a negative dilation and curettage the patient cannot have a carcinoma of the endometrium, we have been fooled time and again. Carcinoma lurking in one corner of the uterus or at the base of a flat polyp may be missed even though the curettage is very thorough." *loc. cit.;* p. 525.

(To be continued)

*We are grateful to Dr. Benjamin Castleman, Editor of "Case Records" and Dr. Joseph Garland, Editor of "The New England Journal of Medicine" for permission to publish these excerpts. They will appear regularly and cover the years 1951 through 1955.

Aphorisms Concerning Chest Diseases—Hemoptysis

By E. S. Crossett, M. D., El Paso

1. Expectoration of blood usually frightens a patient and prompts him to consult a physician. This is fortunate, as hemoptysis is frequently due to serious disease and is the early sign which can lead to an early diagnosis, if proper diagnostic studies are carried out promptly.

2. Every patient who complains of hemoptysis should have a chest X-ray without delay. This frequently will reveal evidence of the offending lesion. However, a negative X-ray does not exclude the possibility of serious disease.

3. The presence of blood in the sputum decreases the percentage of positive findings, but bloody sputum can be examined satisfactorily for both malignant cells and tubercle bacilli and specimens should be submitted for examination without waiting for hemoptysis to cease.

4. Bronchoscopic examination may be advisable before bleeding has ceased. This may contribute to the diagnosis by finding a foreign body, a bronchial ulcer, a stricture or a broncholith eroding through the bronchial wall. In other cases, a tumor may be found and a biopsy taken.

Bronchograms Valuable

5. Bronchograms are of particular value in cases in which the diagnosis is bronchiectasis. These special X-rays may not only reveal the diagnosis, but are of value in revealing the extent and location of the disease and are of real value in determining the treatment of choice.

6. The most common causes of hemoptysis are chronic bronchitis, neoplasms of trachea or bronchi, tuberculosis, bronchiectasis, lung abscess, pneumonia, pulmonary infarction, broncholithiasis, foreign body, lung cysts, and congestive heart failure.

7. Rarely is a pulmonary hemorrhage fatal and when death occurs, it is usually due to obstruction of the airway, rather than exsanguination. Emergency treatment should be directed accordingly.

8. Rest, reassurance and mild sedation are usually all the treatment that is required. Depression of the cough reflex by morphine should be avoided. Rarely, emergency pulmonary resection may be necessary and life saving.

(To be continued)

New Mexico Medical Insurance Plan Elects Officers

The medical insurance plan, New Mexico Physicians' Service, has elected Dr. W. H. Peacock as its new President. Dr. Peacock practices in Farmington. He was a member of the committee which investigated health insurance plans for the New Mexico Medical Society in 1954.

Two Albuquerque physicians, Dr. Omar Legant and Dr. Fred Hanold, were elected Vice President and Secretary-Treasurer, respectively.

Serving on the Board of Trustees are the following physicians:

R. P. Beaudette, M. D., Raton; L. L. Daviet, M. D., Las Cruces; F. H. Hanold, M. D., Albuquerque; A. L. Haynes, M. D., Clovis; J. W. Hillsman, M. D., Carlsbad; H. L. January, M. D., Albuquerque; U. S. Marshall, M. D., Roswell; W. L. Minton, M. D., Lovington; H. M. Mortimer, M. D., Las Vegas; W. H. Peacock, M. D., Farmington; R. V. Seligman, M. D., Albuquerque; C. S. Stone, M. D., Hobbs; O. C. Taylor, Jr., M. D., Artesia and J. P. Turner, M. D., Carrizozo.

A determined effort is being made by the leaders of the New Mexico Physicians' Service to provide at reasonable cost protection for those patients who are tempted by offers of "free" government health insurance.

Industrial Medicine Subject of El Paso Post-Graduate School

Industrial medicine will be the subject of the all-day session of the El Paso Branch, Texas Post-Graduate School of Medicine, to be held starting at 8:30 a. m., Sunday, October 7, in the El Paso County Medical Society's Turner Home at 1301 Montana Street in El Paso, Texas.

Physicians from West Texas, New Mexico, Arizona and Northern Mexico are invited to attend. A credit of seven hours with the American Academy of General Practice will be given those attending the session.

Guest speaker will be Dr. Val C. Baird, Houston, Medical Director of Humble Oil & Refining Co., and President of the Texas Industrial Medicine Association. His two subjects are yet to be announced.

Mr. Smith Pettigrew of Dallas, Medical Co-ordinator for the Texas Employer's Casualty Co., will speak on "Industrial Practice in Relation to the Medical Profession."

Other speakers will be Dr. Leslie M. Smith, of El Paso, "Dermatology of Industrial Origin"; Dr. Robert B. Homan, Jr., El Paso, "Diseases of the Chest of Industrial Origin": Dr. Maurice P. Spearman of El Paso, "Industrial Ophthalmology"; and J. A. Hancock, Ph.D., Professor of Chemistry at Texas Western College, "Industrial Toxicology".

Film on Cardiac Arrest

The prompt and purposeful action that can restart a heart that has stopped is the subject of a new 20-minute color film, "Resuscitation for Cardiac Arrest." Dr. Claude S. Beck, Professor of Cardiovascular Surgery at Western Reserve University, directed the film produced in cooperation with the Cleveland Area Heart Society under the sponsorship of E. R. Squibb & Sons.

By means of a graphic patient demonstration, the film shows the immediate actions that may restore the heart beat — re-establishment of the oxygen system; the bold opening of the chest; the hand massage of the heart, and the use of drugs and electric shock. Next, the film repeats each step of the "cardiac arrest fire drill" at demonstration speed while Dr. Beck discusses in illuminating detail the medical rationale for each of the steps taken.

The picture concludes with the admonition that the "cardiac resuscitation fire drill" should be carried out at regular intervals in every hospital, for cardiac arrest gives no warning.

Medical groups may obtain the use of prints of "Resuscitation for Cardiac Arrest" without charge by writing to Squibb, 745 Fifth Avenue, New York 22, N. Y.

MEETINGS

Partial List of Speakers For Southwestern Medical Association Meeting Announced

Dr. W. E. Nissen of Albuquerque, chairman of the speakers committee for the annual Southwestern Medical Association meeting in Albuquerque, N. M., October 17-19, has announced the list of speakers for the meeting as follows:

W. B. Bean, M. D., Professor of Internal Medicine and Head of the Department, University of Iowa Medical School.

Stephen Rothman, M. D., Professor of Dermatology, and Head of the Section of Dermatology, University of Chicago Medical School.

John Bigler, M.D., Professor of Pediatrics Northwestern University Medical School, and Chief of Staff of Children's Memorial Hospital, Chicago, Illinois.

Colin G. Thomas, Jr., M. D., Assistant Professor of Surgery, University of North Carolina School of Medicine.

Robert H. Barter, M. D., Associate Professor of Obstetrics and Gynecology, George Washington University, Washington, D. C.

Officers of the Association are Dr. John H. Dettweiler, Albuquerque, President; Dr. Celso C. Stapp, El Paso, President-Elect; Dr. E. W. Lander, Roswell, N. M., Vice President; and Dr. Russell L. Deter, El Paso, Secretary-Treasurer.

Southwestern Dermatological Meeting Scheduled in Albuquerque

The annual meeting of Southwestern Dermatological Society will be held in connection with the Southwestern Medical Association meeting in Albuquerque on Saturday, October 20, 1956.

Dr. Samuel J. Jelso, Albuquerque, President of the Society, has announced that there will be a presentation of dermatological cases in the morning, followed by lunch, after which there will be a discussion.

Arrangements are being made to hold the meeting in the new County Indian Hospital.

Southwestern New Mexico Medical Society to Meet

Dr. Clement C. Boehler of El Paso will speak on "Surgical Technique of a Hysterectomy" at the next regular meeting of the Southwestern New Mexico Medical Society in Deming, N. M., September 12. Dr. Boehler will present 70 slides showing a step-by-step procedure. The Silver City group will be host for the meeting. Dr. W. J. Hossley, Jr., of Deming, is president.

Southwest OB-GYN Speakers Announced

Guests speakers for the sixth annual meeting of the Southwest Obstetrical and Gynecological Society, to be held November 12 and 13 in Tucson, Arizona, have been announced by Dr. Hollis H. Brainard, President, of Tucson. The following will participate in the scientific program:

Bayard Carter, M. D., Professor of Obstetrics and Gynecology, Duke University, Durham, North Carolina.

Franklin L. Payne, M. D., Professor of Obstetrics and Gynecology, University of Pennsylvania, Philadelphia, Pennsylvania.

Ralph A. Reis, M. D., Professor of Obstetrics and Gynecology, Northwestern University, Chicago, Illinois.

E. Stewart Taylor, M. D., Professor of Obstetrics and Gynecology, University of Colorado, Denver, Colorado.

Headquarters for the meeting will be at the Arizona Inn. Reservations are to be made directly with the Arizona Inn including time of arrival and departure.

Other officers of the Society are Dr. Lewis A. McRae, Albuquerque, Vice-President; Dr. Jesse A. Rust, San Diego, President-Elect; Dr. Zeph B. Campbell, Phoenix, Secretary; and Dr. Raymond Jennett, Phoenix, Treasurer.

Members of the Convention Committee are Dr. Raymond R. Bates, Dr. Raymond F. Bock, Dr. Max Costin, Dr. George Fraser, Dr. Richard K. Hausmann, Dr. Gordon J. Hippert, Dr. Howard C. James, Dr. G. Arthur Janssen, Dr. Charles J. Newcomb, Dr. Hermann S. Rhu, Dr. William C. Scott and Dr. LaVern D. Sprague.

Patient Reprints Available

Physicians in District One of the Texas Medical Association may obtain for their patients reprints of "Heart Attack," published by the American Heart Association, by writing Victor Fayant, Executive Secretary of the West Texas Heart Association, P. O. Box 1360 in El Paso.

PEDIATRICS

Poliomyelitis-Tonsillectory-Year 1949

Cunning, D. S., Laryngoscope 60:615, 1950

Based on a 4-year study involving 36,678 cases of polio and 96,379 cases of tonsillectomy, it is concluded that no causal relationship exists between poliomyelitis and tonsillectomy. The author suggests postponement of elective surgery during any epidemic, but tonsillectomy need not be deferred simply because the incidence of polio is elevated during summer months.

Clinical Clippings, December, 1950.

MONTHLY CLINICAL PATHOLOGICAL CONFERENCE
EL PASO GENERAL HOSPITAL

July 19, 1956

FREDERICK P. BORNSTEIN, M. D., EDITOR—CASE NO. 601
PRESENTATION OF CASE BY DR. CHARLES E. WEBB

History — Dr. Nathan Kleban:

A 43 year old Latin-American housewife was admitted in coma on January 15, 1956. Relatives were able to furnish only a fragmentary history.

On October 29, 1954, the patient entered the hospital because of her eleventh pregnancy and delivered uneventfully her seventh living child. No unusual physical findings were recorded. Hemoglobin was 7.0 grams. Pallor and the onset of intermittent painless jaundice were noted four months later. A hematinic and vitamins were prescribed by a doctor. Two days before admission the patient became deeply jaundiced, complained of back pain, bled from her nose, passed dark stools and urine, became delirious and was brought to the hospital when she became comatose.

In 1953 the patient exhibited confusion and memory loss for an unknown period of time. She had been blind in the right eye for approximately three years. Past and family history were otherwise non-contributory.

Physical Examination:

The patient was an emaciated, deeply jaundiced woman unresponsive to painful stimulus. T. 99.0. R. 24. P. 132. B. P. 92/56. The right cornea was scarred. The abdomen was equivocally distended with no masses felt. The examiner was uncertain of a mass in palpating the posterior fornix. Deep tendon reflexes were hyperactive, somewhat greater in the right lower extremity than the left.

Hospital Course:

Because of pharyngeal pooling of bloody secretion a tracheotomy was done. Respirations were deep and moderately increased in rate. Temperature ranged from 98 to 104 rectally. Intravenous fluids and electrolytes, twelve units of whole blood, Tetracycline, Levo-arterenol, vitamin K, Penicillin, sedatives, antispasmodics, and vitamins were administered. A surgical consultant thought he felt an epigastric mass on deep palpation.

An enlarged tender liver, palpable spleen, pallor, jaundice and petechiae were noted by a medical consultant. Increased pigmentation over the malar regions were described. Muscle twitching and jerking were present intermittently. On several occasions the patient became responsive, complained of biting her lips and tongue, and of abdominal pain. Stools were either clay-colored or dark red to black, with several jelly-like in consistency.

One-half liter and one and one-half liters of straw-colored ascitic fluid were removed on two occasions. In addition to increasing ascites, edema appeared in the lower extremities, spread to the trunk. Jaundice steadily increased in intensity. Hyperpnea persisted. On the day before death the patient was awake and oriented. Coma and peripheral vascular collapse preceded death on the twentieth hospital day.

X-ray Examinations:

Portable X-ray of chest: "No significant change from the previous examination (December, 1952). Findings consistent with either acid-fast or metastatic lesion." "Bone survey negative for evidence of osteolytic or osteoblastic metastases."

Laboratory Examinations:

Peritoneal fluid (2 specimens); 50 lymphocytes, protein 1.4, S. G. 1.006, culture, no growth, no tumor cells seen. Urine: consistent presence of bile and absence of urobilinogen, S. G. 1.003-1.006, albumin negative to one plus.

Cholesterol and phosphate crystals, 25-35, RBC/HPF on one occasion. Hemoglobin 5.2, 8.3, 12.0, 7.0 grams; Hematocrit 19, 37, 21; WBC 20,000; 14,700; 19,800. Segs. 83, Lymphs 12, Monos. 5. CO_2 20, 16 meq/L. Blood glucose 191 mg. per cent Alkaline phosphatase 16.4, 15.2 Bodansky units.

Blood urea nitgoran 15.2 mg. per cent. Serum albumin 2.2, 3.3, 3.8; Serum globulin 3.2, 2.6, 3.6. Van den Bergh direct 7.1, 15.4; total 10.7, 22.6. Cephalin cholesterol flocculation 2 plus in 24, 4 plus in 48 hours. Prothrombin time 100 per cent, 69 per cent.

Kline exclusion negative. Calcium 8.2. Potassium 3.5 meq/L, Sodium 122 meq/L. Febrile agglutinations negative. Coombs test negative. Spinal fluid: no cells, sugar 98 mg. per cent, total protein 27, culture negative.

Bone marrow: erythroid hyperplasia, probably secondary to blood loss. 24 hour stool contained no urobilinogen. Clotting and bleeding time normal. Sputum culture: Proteus, aerobacter aerogenes, strep viridans.

X-ray Discussion — Dr. Vincent Ravel:

The original examination was January 19, 1956. There is not a great deal of change during the series of X-rays. On the original examination we see a patchy infiltration of the lungs which appears partly fibrotic in nature.

Some of the lesions are soft in character, with no nodular consolidation. There is no evidence of an atelectasis, on the original portable examination. This type of infiltration of the lungs may be the result of numerous causes ranging from the tuberculous and fungus lesions to the less common ones and could be carcinomatous infiltration.

These changes may also be the result of multiple lung abscesses with nothing specific about the findings. In this series of portable films it appears that some of the changes may resolve a little bit and perhaps new ones appear.

Lesion

I do not believe this is a metastatic lesion in the lungs, although it may be. Some of the lesions which remain permanently may be the result of pulmonary metastasis, although I am more inclined to think this is an inflammatory process.

Some of the changes appear to be older and caused by pulmonary fibrosis. The heart, as well as we can determine on these films, is not particularly enlarged. There is no particular evidence of a pericardial effusion.

On this last portable examination I get the impression there is widening of the superior mediastinum. I think possibly there is some mediastinal emphysema which may be the result of the tracheotomy tube.

Streaks

There appears to be some widening of the superior mediastinum and those streaks look as if they might be air. The diaphragm is high throughout these three films and that may be entirely due to the inability of the patient to take a deep breath.

The abdomen appears distended on the last film—it looks like an ascites. There is no evidence of intestinal obstruction. I cannot define the kidney shadows well enough or liver or spleen, to comment on their size.

All the visible skeletal structures appear to be intact. I see no evidence of metastasis involving any of the bones or changes in the bones consistent with any other of the leukemias of lymphoblastomas.

There are other X-rays of the skeletal system that are all negative.

Summary

In a brief summary, there are non-specific changes in the chest consistent with several different diseases, ending up with what looks like a superior mediastinal emphysema and ascites.

Differential Diagnosis: —
Dr. Charles E. Webb:

The first two cases of this jaundice series were presented by Dr. William I. Coldwell and Dr. Joe C. Carter, and they did a very good job. I have gone over the protocols of these three cases and have written down the significant laboratory results and presenting symptoms of the three cases, and summarized them in the accompanying table (See Table No. 1).

TABLE NO. 1

First Case Common Duct Stone	Second Case Cirrhosis of Liver	Third Case ?
Ceph. Floc.:		
2+ in 24 hours 4+ in 48 hours	4+ in 48 hours	2+ in 24 hours 4+ in 48 hours
Alkaline Phosphatase:		
2.1 Bodanksy units	8 Bodanksy units	16.2 and 15.2 Bodanksy units
Van den Bergh Reaction:		
Direct .75 - 10 Total 7.25 and 17	6 8.5	7.1 - 15.4 10.7 and 22.6
Albumin-globulin Ratio:		
Total 4.6	Alb. 2.6	Alb. 2.2, 3.3 and 3.8
History and Physical Findings:		
Seven year history of sporadic episodes of postprandial distress with radiation to tip of right scapula; Chills and fever for 5 years.	Epigastric distress; Anorexia with belching, abdominal swelling and yellow discoloration of eyeballs.	Painless intermittent jaundice and pallor
Weight loss:		
20 pounds	None	Emaciated

Laboratory Review

In reviewing this table from the standpoint of laboratory findings, we see that in the stone case the cephalin flocculation was 2 plus in 24 hours and 4 plus in 48 hours. As you know, tests for jaundice are of little value in the advanced stage of the disease —they have to be done early.

The cephalin flocculation could indicate either medical or surgical disease. In the case of medical disease, namely, cirrhosis, it was 4 plus in 48 hours. The alkaline phosphatase should be elevated in the obstructive case, but it wasn't in our first case.

The total protein in our case is down but shows the proper relation every time it was taken. Now, the Van den Bergh reaction shows an increase in the obstructive type, as it properly should. The prothrombin time is only available on the cirrhosis case and our case.

Liver Damage

It was severely down in the cirrhosis and fell in our case, indicating liver damage. The interpretation of the urobilinogen represents quite a problem. As you will remember, Dr. Carter reminded us at the last meeting that you can have a negative urobilinogen if the damage to the liver is severe enough so that bile secretion has stopped completely.

The findings in the stool suggested total obstruction in the first case and in our case, where they have been reported as clay-colored. Now, going to the synopsis of the history and physical findings, you can

see that these are most important items of consideration.

Diagnosis

I think from them alone you almost can make a diagnosis on these three cases. The common duct stone had a history of seven years of post-prandial pain with radiation to the right scapula. The cirrhosis had epigastric distress and no real pain but anorexia and belching and swelling of the abdomen. The last case had no pain, with intermittent painless jaundice.

Five Year History

The common duct stone had a five year history of chills and fever; there were no chills and fever in the last two cases. The weight loss in the first case was 20 to 30 pounds. There was no weight loss in the cirrhosis case. This goes along pretty well with medical jaundice. The last case was emaciated.

The intake of alcohol in the first case I think was supposed to be moderate, although I think ten beers a day sounds like a pretty good intake to me. There was a history of heavy alcohol intake in the cirrhosis case, there was no history of alcohol intake in the last case.

The main outstanding points in the history of the last case are: pallor, intermittent jaundice, and emaciation.

No Palpable Masses

On physical examination in the common duct stone no masses were palpable. In the cirrhosis case the liver was felt four finger-breadths below the costal margin and in this last case one surgeon thought he felt an epigastric mass, a deep one, and a medical man thought he felt the liver and spleen.

There is no mention of the dates of these examinations. The patient was in the hospital for twenty days, so we do not know whether the last examination was close to, or three weeks later than, the first, but anyway I think it's a little equivocal as to the presence of a mass.

Three points — pallor, painless jaundice, and blood loss — according to the history, were present for at least ten months prior to admission.

Blood Loss

Apparently she was even losing blood farther back than that, so, going back over this chart I think there are more signs in favor of obstructive jaundice than medical jaundice, such as a fairly normal serum protein, a prothrombin time which was normal on admission, and clay colored stools. So I think she had an extra-hepatic obstructive jaundice.

Now, what are the causes of this symptom? First, pancreatitis; second, common duct stone; thirdly, duodenal ulcer; fourth, carcinoma of the head of the pancreas; fifth, peri-ampullar carcinoma.

Red Herring

I am suspecting Dr. Kleban of throwing in a little red herring occasionally, namely, the evidence of bleeding in this patient. Of course, carcinoma of the head of the pancreas may ulcerate into the duodenum and cause hemorrhage, but I don't think this is too common.

Common duct stones of course at times can be painless but usually they have some definite signs of epigastric distress and active symptoms along with their disease. So I feel that this patient had a peri-ampullar carcinoma with spread to the bile ducts, causing cirrhosis in the late stage.

Dr. Maurice C. Davidson:

One factor which suggests carcinoma of the head of the pancreas as a more likely diagnosis is the fact that the blood glucose was very high on the only determination present, suggesting destruction of the pancreas.

Clinical Impression: Carcinoma of the head of the pancreas.

Dr. Charles E. Webb's Diagnosis: Carcinoma of the ampulla of Vater with spread to bile ducts.

Pathological Diagnosis: Carcinoma of the gall bladder with direct extension to the liver and duodenum; duodenal erosion with intestinal hemorrhage.

Pathological Discussion: Dr. Frederick P. Bornstein:

On autopsy we found an extremely emaciated and severely jaundiced woman. The peritoneal cavity contained several thousand cc. of straw colored fluid. On opening the stomach and duodenum we found a very extensive hemorrhage.

We found a bleeding point in the duodenum; on further examination we found a carcinoma of the gall bladder which had infiltrated downward into the duodenum, producing the hemorrhage. In addition, this carcinoma had produced complete obstruction of the common bile duct and had directly invaded the liver.

Also present were metastases to the lungs. As is commonly the case, the carcinoma was associated with a stone.

Histologically, this was a rather anaplastic adenocarcinoma. The other important histological finding consisted of extreme necrosis and destruction of the liver tissue due to the long-standing obstructive lesion.

Uniformly Fatal

In the last few years we have seen a considerable number of carcinomas of the gall bladder which have proven uniformly fatal, regardless of whether the gall

bladder was removed surgically or whether the carcinoma was found at autopsy. The carcinoma of the gall bladder has a tendency towards immediate invasion of the liver, which makes surgical eradication nearly impossible, and in addition, distant metastases occur at an early stage.

It is interesting to note there is a general assumption that in carcinoma associated with obstructive jaundice, we are generally dealing with a carcinoma of the head of the pancreas. This has not been borne out by our experience.

Large Incidence

We have seen a great number of primary hepatomas, common duct carcinomas, and gall bladder carcinomas, which represent a larger incidence of carcinoma than that found in the head of the pancreas.

This is also pointed out in Willis' text book on the pathology of tumors. As a final remark to this series of cases of jaundice, I would like to say that in the 1300 autopsies which I have performed in the last four years, there were about fifty cases in which death was due to jaundice.

Two Operable Cases

Thirty-five of these cases belong to the group of cirrhosis and hepatitis. The rest were various carcinomas. We only had two operable surgical cases such as stone or stricture producing fatal jaundice. All the other surgical jaundice cases which entered the hospital evidently went home. The only fatal surgical cases are the relatively small groups of carcinomas, while the rest of the fatal cases are due to medical jaundice.

For your enjoyment – Courtesy of Boyle and Company

"Not that crank, O'Brien!"

ORIGINAL ARTICLES

Management of Hand Injuries*

By Keith A. Walker, Lt. Colonel, MC,
William Beaumont Army Hospital, El Paso

In the United States each year there are over 10,000,000 accidental injuries. Over two million of these are occupational injuries. Approximately 35 per cent of these occupational injuries involve the upper extremity with approximately 30 per cent of the total involving the hand alone.

Each year the accidental injuries cost in excess of 10 billion dollars. About a third of this amount is for occupational injuries so about one billion dollars each year represents the cost for occupational injuries alone in which the hand is involved. (These figures were obtained from the National Safety Council).

In times of combat or mass casualties the incidence of hand injuries appreciably increases.

British Report

Clarkson reporting on the accident service of Guys Hospital in London, England, indicates that 3,000 of 11,000 annual accident cases seen in that hospital are injuries of the hand.

I do not have accident statistics for William Beaumont Army Hospital, as many of our cases are never admitted; but certainly in a group of active young men working with their hands such as we have in the military, I would expect the incidence to be as high or higher than in civil life.

In consideration of injuries to the hand with particular regard to their management several important factors must be kept in mind. These are:

1. Type of and mechanism of injury such as:
   Laceration
   Crushing
   Avulsion
   Blast
2. Type of first aid received.
3. Time elapsed between injury and surgeon's examination.

These three factors must be evaluated and weighed in consideration of the primary aim of the surgeon, namely, the return of maximum function to the injured hand.

Requirements

The requirements for maximum return of function are:

Freedom from infection.
Proper surgical repair of wounded tissue.
Prevention and elimination of contractures.

These precepts then form the principles of treatment. Let us now discuss them in more detail.

To accomplish freedom from infection, or to keep it minimal, in wounds of the hand it is obvious that the badly damaged, mangled hand, which was crushed by a dirty set of gears and in which there is much contamination is a far different problem from the cleanly incised wound sustained by a housewife when she cuts her finger on a sharp knife while washing dishes in her kitchen sink.

Different Problem

The patient who is seen immediately by experienced first aid technicians and whose wound is covered with a sterile dressing and then sent immediately to the surgeon is a far different problem from the patient who has been delayed six to eight hours before seeing a surgeon. The wound which has been inspected by many examiners under other than sterile conditions, which has been probed, or as happens so many times, has been infiltrated with local anesthesia then probed and dissected in the local dispensary or batallion aid station before being sent to the surgeon for definitive treatment becomes an exceedingly complex problem.

Before the advent of antibiotics six hours was considered the maximum time in which definitive repair in the hand should be performed and two hours the maximum elapsed time that initial repair of flexor tendons within their sheaths should be accomplished.

Time Limit Extended

Since the use of antibiotics this time limit has been extended. Elapsed time is still a valuable consideration in evaluating the amount of definitive surgical treatment to be given initially, however, other factors too must be considered, namely, degree of contamination and amount of tissue damaged, skin available for primary closure, associated fractures, general condition of the patient, availability of operating facilities and availability of qualified trained professional assistance and anesthesia.

Considering all of these factors the general policy here at William Beaumont has been this:

1. Cleanly incised wounds of the hand without associated fractures or tendon involvement may be closed up to 24 hours.

2. Clean incised wounds with extensor tendons involved may be repaired and closed up to 12 hours. Clean incised wounds with involvement of flexor

* From Symposium on Surgery in Acute Trauma delivered at William Beaumont Army Hospital, April 1956

tendons within their sheaths may be repaired up to six hours after injury providing the wound has not been probed, sutured or otherwise complicated prior to being received here.

3. The badly crushed, grossly contaminated injuries to the hand have to be carefully evaluated on their own merits and no fixed guide can be established. Battle wounds for the most part fall into this category and factors learned in World War II and Korea can be applied to these cases. Some of these factors are:

a. The dictum of, "Save as much as possible."

b. "Never remove anything that has a chance of survival."

c. "Do not sacrifice skin or bone, fillet any devitalized finger and save skin for coverage."

d. "Cover the tendons and bone if at all possible but do not close the wound tightly."

e. "Apply good post operative immobilization but do not immobilize *too* long."

Having considered in general factors involved in handling of hand injuries let us now proceed to more specific details.

First Aid

The first aid care of a wound of the hand consists of application of a sterile compression dressing. This should be adequate to cover the wound and if voluminous can also serve very well as an immobilizing splint. Splintage of the injured hand is important in that it reduces pain and aids in control of hemorrhage, also it decreases the spread of contamination.

Ligation of bleeding points has no place as a first aid measure. Bleeding can be controlled by well applied compression dressings in all cases.

Tourniquets have no place in management of hemorrhage as far as I am concerned.

Rapid evacuation directly to the place of definitive therapy is also important.

Definitive Surgical Care

In the definitive treatment phase the following are to be considered:

1. Bell and Mason (1953) in a report of 112 patients with crushing injuries of the hand, certainly the most shocking type of injury, reported 10 per cent of their cases exhibited degrees of shock sufficient to require transfusion therapy.

2. Rapid and complete evaluation of the extent of injury to the hand. This should be performed under as aseptic conditions as possible, take as brief time as possible but be complete. The extent and type of wounding can be accurately visualized, the viability of parts grossly determined. The division of tendons and nerves can be checked and no examination is complete without survey x-rays.

In examination of the injured hand a few moments spent in gaining the patient's confidence and reassuring him that the examination is of most importance and will not be unduly painful is very worth while. Much valuable information can be obtained and possibly much surgical time and unnecessary exploration can be avoided if complete preoperative examination has been carried out.

Remember the anatomy of the tendons and nerves and the examination is very simple.

3. Having assessed the injury as to location and extent, replace the sterile compression dressing and splint and obtain the necessary history, physical examination and laboratory work.

4. The immediate institution of antibiotic therapy is most important. So many persons are becoming sensitive to penicillin we inquire regularly regarding this sensitivity and then use a broad spectrum antibiotic. The antibiotic is given systematically, there being little indication for topical antibiotics.

5. In all our military personnel a booster dose of tetanus toxoid then 1500 units of tetanus antitoxin is given.

6. Morphine, atropine and a barbiturate are administered as preanesthetic medication.

Anesthesia

Local 1 per cent procaine infiltration anesthesia without epinephrine or nerve blocks of ulnar nerves at the elbow and median nerve at wrist can be used very satisfactorily.

If possible a brachial plexus block gives excellent anesthesia for hand and forearm surgery and will give good anesthesia for several hours. Because of the extension of the second thoracic dermatome on the medial side of the arm occasionally pain from the tourniquet will require additional anesthetic agent.

For the actual definitive surgical procedure good assistants are required. This includes a nurse and at least one qualified assistant. The light should be good, there should be a firm table and stools upon which to sit. All necessary surgical equipment should be available. Lacking these requirements, if no other definitive surgical facilities are available or as many times happens there is a question of competence in the surgeon's mind, the wisest course of action is to very thoroughly cleanse and debride the wound and then close it if it falls within the critera for closing previously outlined. Relying on the fact that primary healing will most likely take place in three weeks or more under more ideal circumstances the definitive reconstruction or delayed primary repair of deep structures can take place. This procedure is a wise course to follow if there is any question as to the degree of contamination or possible infection.

DEBRIDEMENT
This takes place in two phases:

1. Preparing the field — done in the operating room under anesthesia and with tourniquet the sur-

rounding area is gently washed with gauze sponge using water and a mild detergent. This cleansing takes ten minutes by the clock.

A fresh gown, gloves and prep tray are then used for staining the hand as this interferes with good visdetergents are used. I do not use any colored material for staining the hand as this interferes with good visualization of nail bed circulation and also color and viability of tissues.

2. After sterile draping very careful surgical debridement of the wound takes place. This should be sharp debridement and should follow the basic precepts of good surgical debridement. This requires understanding of degree of viability of tissue and an awareness of future reconstruction possibilities.

Conservation of skin is most important. If there is a question about the viability of skin leave it.

Fascia—sacrifice if in question.

Fat—sacrifice if any doubt about being contaminated.

Nerves—leave all possible.

Blood vessels—accurate and complete hemostasis most important.

Bone—leave all possible. If in a clean field it will live, even that detached from a periosteum.

Tendon—remove frayed contaminated tendon. Do not pull down tendons, trim the end and then permit them to retract into clean areas of the hand or forearm spreading contamination.

After adequate debridement comes repair, the following points should be kept in mind.

1. Adequate exposure, this means generous well placed incisions. These incisions should be placed in sites of election or the initial wounds should be enlarged in such a manner as to observe the placing of incisions so scars do not contract. Additional incisions many times are most valuable and should be used.

2. Primary and initial reduction of fractures and adequate fixation is most important. Internal fixation of fractures so that external immobilization devices can be discarded is being used more and more.

3. Nerves—primary repair with 50 black silk is recommended in clean wounds. In septic wounds do not molest nerves. Do not tag the ends, this is not necessary. Sensation in the functioning hand is most important.

4. Tendons—if primary anastomosis can be accomplished, this is to be desired. On extensor surfaces we use 40 black silk. In flexor tendon resection of the sublimis, tendon is usually carried out if primary repair of the profundus is to be attempted. The resected sublimis can be used very effectively if tendon graft is needed. We use braided stainless steel wire for flexor tendon repair.

5. Skin closure—in all clean wounds this is most important, and if conditions are favorable both from time elapsed, adequacy of debridement and ability to personally follow the patient, even battle field wounds should be closed loosely. Coverage of bone and tendon with skin is most important.

If necessary, skin graft should be employed to give cover to the injured hand.

a. The skin graft may be in the form of a split graft (to be used only as a skin dressing).

b. Free full thickness skin graft. Small graft not more than 2 cm. in diameter usually and cut quite thin. This may be taken from the flexor surface of the forearm.

c. Pedicle flap—gives excellent full thickness cover but associated injuries to bone and tendon must also be considered. If good stability of fractures without external fixating devices and if good functional position of the injured hand can be maintained pedicle flaps may be considered.

The use of skin fillet from a severely mangled finger may furnish much valuable skin for coverage.

Shifting local full thickness bipedicle or unipedicle flaps must be kept in mind.

6. Traumatic amputation—conserve as much length as possible, close then by shifting skin and resect the nerves so that painful neuromas do not form. I do not believe that putting nerve ends into drill holes in bone decreases neuroma formation and do not believe that suturing tendons over the ends of bone has any value.

Dressing and Splinting

A resilient compression dressing is applied to aid in hemostasis, hold skin flaps in place, and to aid in keeping edema at minimum.

Splintage in position of function either in plaster splint molded to the extremity or Allen (derby hat) universal hand splint is most important.

Under no circumstances should splintage be continued in excess of 21 days.

More deformities of the injured hand have resulted from too much rather than too little immobilization.

As early as possible active motion of the hand should be instituted; this is the best prevention of contractures.

Summary

Treat hand injuries early and actively. Attempt to keep the hand free from infection and the scar tissue minimal. Always keep the hand in a position of function.

Chlorpromazine (Thorazine) Jaundice

By Daniel H. Goodman, M. D., Phoenix

Chlorpromazine (Thorazine), since its release in this country in May 1954, is being used for an increasingly large number of conditions in practically every field of medicine. One of its most common and popular uses is for its remarkable antinauseant and anti-emetic effects.

It is also used widely in the symptomatic treatment of alcoholism, barbiturate intoxication, and withdrawal symptoms, in bronchial asthma, delirium tremens, epilepsy, hiccoughs, hypothermic anesthesia, hypertension, Meniere's disease, peripheral vascular disease, paralysis agitans (Parkinson's disease), pruritus, psychomotor tension incident to psychotic and psychoneurotic reaction types, and seasickness. It apparently potentiates the effects of certain other drugs, such as narcotics, anesthetics, sedatives and hypnotics.

Depressing Action

Pharmacologically, Chlorpromazine has a depressing action on the central nervous system, with secondary antispasmodic, antihistaminic and adrenolytic activities.[1] It produces a stasis in the biliary tree due to an increase in the resistance of the choledochoduodenal sphincter. Duodenal motility is depressed.

The most serious complication of Chlorpromazine The exact incidence of Thorazine jaundice is not administration has been the occurrence of jaundice. known. It is estimated at about one percent (1%) of those receiving the drug for two weeks. However, since Thorazine is being used so extensively, the absolute number of cases appears to be considerable.

Readily Confused

Since the prodromal and clinical manifestations preceding the jaundice associated with the administration of Chlorpromazine closely resemble and might be readily confused with that of viral hepatitis or acute cholecystitis and cholelithiasis, or an obstructive surgical type of jaundice, it is imperative that this type of jaundice be readily recognized, in order to obviate any unwarranted surgical procedures, which might further damage the patient's health. The jaundice may develop insidiously.

However, usually there is a group of prodromal symptoms, characterized by anorexia, malaise, nausea, vomiting, right upper quadrant or epigastric pain and tenderness, associated with chills and fever up to 103°. Nausea and vomiting will develop even though Chlorpromazine is being taken as an anti-emetic.

Later, the patient will note a dark brown urine, clay-colored stools, tenderness over the liver area, pruritus and icteric sclerae and jaundice.

From the Departments of Medicine of Good Samaritan, Maricopa County General, Memorial, St. Joseph's and St. Luke's Hospitals, Phoenix.

Laboratory Studies

Laboratory studies after the appearance of jaundice give results similar to those observed in obstructive (surgical) jaundice with but one major difference.

The one unusual, remarkable and diagnostic feature, if found, is that of a marked eosinophilia in the peripheral blood, the eosinophilia being as high as 42%.[2] The eosinophilia is transient and occurs in about 50% of the cases. There is marked elevation of the serum bilirubin level; there is bile in the urine, elevated concentrations of alkaline phosphatase and serum cholesterol, and low excretion of urobilinogen in the urine.

Liver function tests for hepatocellular damage are normal. There are no abnormalities of the cephalin flocculation test, thymol turbidity, the albumin-globulin ratio, prothrombin time or cholesterol esters.

Since Thorazine jaundice presents a clinical and laboratory picture simulating surgical obstructive jaundice, the report of this case is justified, in order that early recognition of this complication be achieved.

Report Of Case

A 42-year-old, white male was first seen on February 24th with complaints of epigastric pain with nausea and vomiting. There was no diarrhea. Temperature was 98.6 degrees. Examination that morning revealed only slight tenderness in the right upper quadrant. There was no rigidity.

The liver was not palpated. That evening, the patient was again seen because of increasing nausea and vomiting, and with a temperature rise of 102 degrees. The pain was in the epigastrium and under the sternum, with slight to moderate tenderness in the right upper quadrant.

General physical examination otherwise was negative. The sclerae were clear. The urine was normal. It was the initial impression of the examiner at the time that the patient had an acute cholecystitis. He was placed on broad spectrum antibiotics, antispasmodics, sedation and liquids.

On the following day, the temperature rose to 103 degrees, associated with a chill. The patient was kept on the preceding management for acute cholecystitis, and in several days, the temperature subsided to normal. However, there persisted a marked anorexia with malaise and a weakness out of all proportion to the underlying illness.

Cholecystography

Cholecystrography performed during this quiescent period with no clinical evidence of jaundice revealed a gallbladder to be well-visualized with no evidence of any calculi. The gallbladder emptied well. The

patient was maintained on a low fat bland diet, antispasmodics, and was told to remain at bed rest.

One week later, the patient presented himself with the complaint of increased anorexia, loss of 9 lbs. in weight, marked weakness, malaise, and noted that the urine was extremely dark, like very strong tea or coffee.

Examination of the urine at that time revealed evidence of great amounts of bile and clinically, the patient appeared to be mildly icteric.

On further questioning, it was learned that two weeks prior to the initial onset of nausea, vomiting and pain in the epigastrium, the patient had been taking Thorazine 25 mgm. tid. This medication was prescribed by another physician as symptomatic relief for nausea and a mild anxiety state.

Patient Hospitalized

The patient was hospitalized, and the initial blood count was very revealing. There was an eosinophilia of 40 per cent. The total white count was 9,250. Studies of the liver function revealed the following: Alkaline phosphatase 19.7; thymol turbidity 2.8; cephalin flocculation test negative; cholesterol 471 mgm. per cent; serum bilirubin, direct 4.4 mgm. per cent, indirect 8.8 mgm. per cent; sedimentation rate 30 mm. per hour; prothrombin time, control 12.5 seconds, patient's 13.0 seconds.

The urine contained great quantities of bile; urobilinogen 1:20. The stool was very light, almost clay-colored. The icterus index was 55 units. Sedimentation rate was three mm. per hour.

The patient was placed upon a regime usually prescribed for those with infectious hepatitis. He was at complete bed rest. A diet high in protein and carbohydrates, low in fat, was given. The appetite returned gradually, with a gradual return of weight to that prior to the onset of the jaundice.

Pruritus

Pruritus, which at first was severe and troublesome, subsided with decrease in the jaundice. The liver function tests repeatedly gave elevated readings for the alkaline phosphatase test and serum cholesterol. Thymol turbidity and cephalin flocculation tests were repeatedly normal. The serum bilirubin diminished but slightly, and slowly. The jaundice was clinically manifest for seven weeks, and upon discharge from the hospital, after a total illness of nine weeks, the serum bilirubin was still slightly over 1 mgm. The bromsulfalein test (BSP) revealed no evidence of any parenchymal damage. It was negative.

Comment

It is clearly evident that the jaundice associated with the administration of Chlorpromazine can readily be confused clinically with that of infectious or viral hepatitis, and in its laboratory manifestations with obstructive or surgical jaundice.

The greatest danger lies in the confusion with obstructive surgical jaundice and the needless surgery that may follow. This, of course, has occurred in many cases that are reported in the literature [2, 3]. It is for this very purpose that this case is reported.

Clinicians should become increasingly aware of the danger of jaundice due to Chlorpromazine that needless surgery may be avoided. The depth and duration of jaundice are variable.

Jaundice has remained as long as seven months.

Van Ommen and Brown [2] report one of their cases to be on the way to recovery only after twelve weeks in the hospital. However, the recovery time in this case may have been prolonged by the adverse effect of the surgical procedure on hepatic function. Another of their patients continued to be jaundiced after three months of observation.

No Distinct Relationship

There appears to be no distinct relationship between the mode or amount of Thorazine administered and the onset of jaundice. In most of the cases reported the jaundice appeared after two weeks of Thorazine therapy. However, the author is aware of a case of jaundice following the ingestion of only 50 mg. Thorazine and one following 25 mg. of Thorazine by intramuscular injection.

Chlorpromazine jaundice has features similar to those reported in cases of jaundice associated with Arsphenamine[5] and Methyl Testosterone[6] therapy. The liver biopsy findings are identical to those reported by Hanger and Gutman[5] in jaundice after Arsphenamine therapy. Eosinophilia also was found in some patients with jaundice following Arsphenamine and Methyl Testosterone therapy[6].

Findings

The findings of liver function tests, studies of bilirubin circulation and liver biopsy in patients with Chlorpromazine jaundice indicate biliary obstruction.

Aside from the transitory eosinophilia early in the genesis of the jaundice, and the history of Chlorpromazine ingestion, there is no test that clearly differentiates jaundice due to Chlorpromazine from obstructive or surgical jaundice resulting from other conditions, such as a common duct stone or carcinoma of the pancreas.

Liver biopsy of patients with Chlorpromazine jaundice reveals a characteristic cholestasis in the biliary canaliculi, with no evidence of liver cell damage. The hepatocellular liver function tests remain normal[7] even after prolonged periods of jaundice. The mechanism of Chlorpromazine jaundice is unknown.

The possibility of a hypersensitivity or an allergic state has been hypothesized. However, steroid therapy has been of little avail in the treatment of Chlorpromazine jaundice.

Study In Dogs

A study in dogs has revealed that Chlorpromazine produces stasis in the biliary tree due to an increase in the resistance of the Choledochoduodenal sphincter. These changes appear to be related to the depressing effects of Chlorpromazine on duodenal motility[1].

The treatment of Chlorpromazine jaundice, in addition to immediate discontinuance of the drug, is that of the usual therapeutic program for liver damage—a diet high in proteins and carbohydrates, low in fats, vitamins and bed rest. Antispasmodics and bile salts may be of value in stimulating the flow of bile. Steroids may be tried.

Summary

Chlorpromazine (Thorazine) therapy is not infrequently complicated by an obstructive type jaundice. Clinically, the onset may be manifested by malaise, nausea, vomiting, anorexia, chills, fever with an elevation up to as high as 103 degrees, hepatic tenderness, epigastric distress, dark urine, increasing icterus, and clay-colored stools. The characteristic laboratory finding is, early in the disease, a transient eosinophilia in the peripheral blood, which may reach a height of 40 per cent.

Characteristically, the liver function tests are those of biliary obstruction—that is, normal thymol turbidity, cephalin flocculation tests, albumin-globulin ratio, prothrombin time. The alkaline phosphatase and serum cholesterol are markedly elevated.

There is no evidence of any residual hepatocellular damage. The chief importance of the recognition of Chlorpromazine jaundice is to differentiate it from surgical obstructive jaundice, in order to prevent unnecessary surgery.

The elicitation of a history of previous drug therapy with Chlorpromazine and the finding of a transient eosinophilia are the most helpful and essential factors in the differential diagnosis in establishing the jaundice as being due to Thorazine.

A case typical of Thorazine jaundice with a high peripheral eosinophile count is described.

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CLINICAL NOTES FROM GRAND ROUNDS

These notes are abstracts of opinions expressed by staff members during case presentations at the Friday Grand Rounds of the Pratt Diagnostic Clinic—New England Center Hospital.

Steatorrhea occurring in males past middle age in association with rheumatoid arthritis should call the possibility of Whipple's disease (intestinal lipodystrophy) to mind. Other cases of steatorrhea may be caused by pancreatitis; in these there is usually a history of alcoholism or biliary tract disease and there may be an associated diabetes. In sprue, steatorrhea also may occur; diarrhea is not always present but the stool is bulky. Exacerbations in sprue are apt to follow infections and emotional stresses. Treatment of sprue is fairly successful with folic acid, liver extract, and cortisone or ACTH. It is a lifetime disease characterized by remissions and exacerbations.

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Aldosterone, a recently identified hormone of the adrenal cortex, has been found to have a marked effect upon sodium (and water) retention. The secretion of this hormone in man is only partially controlled by corticotropin (ACTH). Salt depletion causes an increased production of aldosterone; potassium depletion has an opposite effect. Since this hormone is not completely under pituitary control, it is now clearer why patients with pituitary insufficiency often do not show clear evidence of adrenal insufficiency.

OTOLOGY

The Prevention Of Deafness

Walls, E. G., New Orleans M. & S. J. 103:74, 1950

In his discussion the essayist mentions heredity as an etiologic factor in some types of deafness. If both mother and father are otosclerotic the condition may be expected to develop in 50 to 75 per cent of sons and almost all daughters of such parents. The observation that onset of otosclerosis frequently coincides with emotional and physical stress warrants consideration.

Clinical Clippings, November, 1950.

RHEUMATIC FEVER—PARA-AMINOBENZOIC ACID

Hoagland, R. J., Am. J. Med. 9:272, 1950

A patient with rheumatic fever who was refractive to 10 Gm. of acetylsalicylic acid daily as evidenced by persistence of fever for five weeks, experienced immediate and pronounced improvement following supplemental use of para-aminobenzoic acid in doses of 24 Gm. daily.

Clinical Clippings, November, 1950.

Cardiac Arrest

By Manley B. Cohen, M. D., El Paso

Cardiac arrest is a seldom seen accident at surgery, but its occurrence is catastrophic. The time is rapidly approaching, in truth if it is not already here, when the physician may be considered culpable if prompt resuscitative measures are not instituted. Every physician doing the simplest operations should be thoroughly familiar with the proper treatment. Some clinics report as much as 30-40 per cent resuscitations. (1)

Starling and Land (2) in 1902 reported the first successful cardiac resuscitation in man. Crile and Dolley (3) in 1906 suggested artificial respiration be used with cardiac massage. Beck (4) in 1947 reported the first successful defibrillation of the human heart by electric shock.

Immediate Recognition

Successful therapy is dependent entirely on immediate recognition of cardiac arrest. A positive and bold attitude on the part of both the surgeon and anesthesiologist in the institution of resuscitative measures is imperative and must not be delayed. Resuscitation is equally dependent on restoration of an adequate airway and administration of oxygen, and institution of cardiac massage.

Proper cardiac massage through the intact diaphragm can hardily be performed. To be sure, successful massage can be carried out in this manner. In fact, the first successful cases were resuscitated in this manner. It is understandable that for the surgeon in the midst of an abdominal operation, cardiac massage through the diaphragm may appear feasible. However, it does take time to make a new abdominal incision or extend one already made. Even if the incision is fortunately placed and sufficiently large, it is necessary to gain exposure of the diaphragm. It must be understood that the prime purpose of cardiac massage is to move blood through the heart and maintain circulation to vulnerable areas (5).

Physical Impossibility

To do this through an intact diaphragm with sufficient rapidity and force for any length of time is physically impossible. Therefore, many surgeons will incise the diaphragm. The exposure necessary for this manoeuvre and for making incision also takes time which can ill be afforded. Furthermore the heart cannot be visualized and drugs cannot be accurately administered and the defibrillator cannot be used.

When one considers that the thoracotomy incision can be made in 10 to 15 seconds, that the heart thus may be directly visualized and grasped in the hand of the surgeon, that the heart is easily available for the injection of various drugs and defibrillation carried out, the advantages of the thoracotomy incision far outweigh any abdominal approach. The argument that many will offer against the thoracic approach is the necessity of a second incision. This must not be considered when the patient's life is in the balance.

Immediate Action

This success of cardiac resuscitation is dependent on immediate institution of the only type of therapy, and it must be complete therapy, that can offer success in the greatest number of cases. We must be prepared to use all possible means in the best manner possible to meet the gravest emergency encountered in the operating room. Either complete therapy is instituted or the chance of failure are so great as to be prohibitive. Cardiac massage must be begun within a period of less than three minutes after cardiac arrest occurs, and the sooner it is done, the better for the patient. No hesitation can be countenanced.

A blood pressure that cannot be obtained, a pulse that is not palpable is all the reason necessary for action. Do not attempt to palpate the pulse or listen to the heart. One easily may confuse his own heart beat or pulse with that of the patient. Do not play with the blood pressure cuff or change it to the other arm. Do not administer artificial respiration. Do not wait for electrocardiograms.

Do not inject epinephrine through the chest wall into the heart. Do not give blood transfusion or arterial transfusion. Do not dilate the rectal sphincter. Do not make an abdominal incision to attempt subdiaphragmatic cardiac massage. Do not attempt intramuscular or intravenous medication.

Do Not Wait

Do not wait for a surgical preparation of the chest prior to making the incision since time is at a premium. The thoracic incision is made through the left fourth or fifth interspaces. Do not stop to count spaces. Since there is no circulation, bleeding from the wound is no concern.

The incision starts at the medial border of the sternum, is extended through the fourth or fifth intercostal space approximately to the mid-axillary line. The incision is quickly deepened through the pleura. The initial opening in the pleura should be done with sufficient care to avoid injury to the underlying lung and heart. Once the pleural space is entered, the pleura can be rapidly divided with scissors or knife.

The cartilage above and below the interspace is then divided to provide more space if necessary. The heart is then grasped in the hand, applying the thumb anteriorly, and the fingers posteriorly, with the apex resting in the palm of the hand.

Massage

Massage is carried out by squeezing the ventricles between the four fingers and thumb in such a manner as to secure as much cardiac emptying as pos-

sible. Pressure should be applied by the fingers by rapidly closing the fingers in a consecutive manner starting with the little finger and against the thumb. Massage should be carried out at least at a rate of 60 per minute, and preferably 80 per minute or more if possible. Proper massage can raise the systolic blood pressure to 60 or 80 mm. of Hg. (5) It is well to inject 1-2 c.c. of 1 per cent procaine beneath the pericardium to reduce heart irritability once massage has been instituted.

Assistant Imperative

Since massage is extremely fatiguing to the hand, it is imperative that at least one assistant is available to spell the surgeon. Massage is continued until autonomous contractions occur. The adequacy of cardiac massage is measured by the ability to determine a good color, a pulse and blood pressure.

If adequate massage cannot be performed through the intact pericardium, the pericardium should be opened. If contractions remain weak, 0.5. cc. of epinephrine 1:1000 may be injected into the right ventricle to help reinforce the contractions.

Massage should be continued for at least 60 minutes (4) before hope is lost of resuscitation. If ventricular fibrillation occurs, inject 5 c. c. of 1 per cent procaine into the right ventricle. Procaine alone may break the fibrillation. If necessary the defibrillator is applied. One electrode is placed in back, the other in front.

Covered With Gauze

The electrodes should be covered with gauze soaked in isotonic saline solutions. Short rapidly repeated shocks (5 to 10) are given using 1.5 amperes with 110 volt alternating current. Shocks should be applied for 0.1 seconds at 1 second intervals. The surgeon should stand well away from the table, and wear rubber gloves to avoid receiving a shock.

The voltage may have to be increased to 130 volts or even 150 volts if defibrillation fails to occur. If the electrodes are large enough, more than 130 volts should not be necessary. An isolation transformer incorporated in the defibrillator unit will guard against electric shocks to the operator. Heart action will stop if defibrillation is successful.

Massage is then continued until supraventricular rhythm is restored. If the heart remains flabby or fails to contract effectively after defibrillation has occurred, heart tons may be increased by injecting 0.5 cc. of epinephrine, 1:1000 into the right ventrile. If epinephrine fails, 1-2 cc. of 0.5 per cent Ba C12 or preferably 10 cc. of 1 per Ca C12 (5) may be injected into the left ventricle.

Chest Closed

When resuscitative measures have been completed, bleeding points are controlled and the chest is closed in an airtight manner while the anaesthetist maintains positive pressure. It is wise to place several pericostal sutures in order to provide stability and approximate the tissues.

The anesthesiologist as already stated plays a role of equal importance to that of the surgeon. Before attempting the thoracic incision, an adequate airway must be established. If an endotracheal tube is in place so much the better. However, it must be carefully checked for kinking, proper placement and tight fit.

If one is not placed, an endotracheal tube should be passed. Since there is complete relaxation, passing the tube should not be difficult or overly prolonged. The tracheobronchial tree is ascertained to be dry or every attempt made to carry out thorough aspiration as quickly as possible. The patient is placed in 10 degrees of Trendelenberg to increase the availability of blood to the brain.

Vagal Influences

In order to counteract any vagal influences, it is wise to give atropine sulphate, gr 1/100 intravenously. The anesthesiologist should assume direction for recording time intervals and for the administration of electrolytes, blood, blood derivatives and substitutes.

When meeting a disaster of the type confronted in cardiac arrest, there is extreme excitement among all the personnel of the operating room, a mass of conflicting orders and no order of procedure unless a definite program has previously been established.

Therefore, every operating room should establish a set procedure to meet this emergency. Personnel must understand the roles they are to play. Nothing can prepare them better than practice sessions. Cardiac emergency kits containing the necessary drugs and instruments should be prepared and kept easily available.

The personnel should include a clock watcher and a recorder in order to keep track of rapidly occuring events. Under conditions where all the staff is ready to meet the emergency, many patients will be resuscitated successfully.

Summary

Cardiac arrest is a reversible process. The most important single therapeutic measure is cardiac massage, and this must be begun within three minutes following this accident. The anesthesiologist must provide an adequate airway, and oxygen for the patient. The most rapid and most satisfactory means of providing cardiac massage is through a thoracotomy wound. Once cardiac massage is instituted, other resuscitative measures may be used if indicated.

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The Cranio-Cervical Injury and Post-Traumatic Headache

By J. Paul Rader, M. D., Odessa, Texas

Introduction

Our understanding and treatment of cranio-*cerebral* injuries has advanced greatly in the past 25 years. In our modern day, high velocity society, however, these injuries have become increasingly complex. Often not one, but a series of rapidly occurring blows to the head, as in vehicular collisions, imparts to the skull divers accelerations and rotations. In many of these instances the attachment of the head to the neck is subjected to severe and often damaging stresses.

Frequently after head injuries, patients will complain for a long time of persistent, disabling headache. Usually complete neurological examination in these cases fails to disclose any reason for the headaches. Subsequently, when treatment results in limited or no improvement, these patients are often classified as having post traumatic headache or post concussion syndrome or diagnosed as having neurotic personality. They are thus relegated to a therapeutic blind alley whose end is frustration and continuing disability.

The present study was carried out in an effort to clarify the role played by the neck in the production and character of headache following head injury.

Definition

A cranio-*cervical* injury is one in which a force is applied to the head in such a way that both the head and the neck are injured.

Selection of Cases

Between January 1, 1953 and May 15, 1955, 200 consecutive cases of head injury were studied (with the exceptions noted below.) These included hospitalized and nonhospitalized patients, as well as those seen only for diagnosis and evaluation. All patients under six years of age and those who failed to regain consciousness or who expired were excluded from the study, because of the difficulty of obtaining and evaluating an accurate description of symptoms and physical findings. So called whip-lash injuries were also omitted because demonstrable head trauma was usually absent (these injuries, however, have a great deal in common with those under discussion here, being in a sense, mirror images of them.)

There were 34 females (17 per cent) and 166 males (83 per cent). Ages ranged from six to 72 years. In 88 cases (44 per cent) the injuries were the result of vehicular accidents. The remaining 112 cases (56 per cent) were irregularly distributed among a variety of mishaps such as falls, either from a height or on the level, or being struck by moving objects, including lengths of pipe, clubs and other implements and missiles. Duration of symptoms varied from a few hours to several years. Six of these patients were subjected to surgery, three for subdural hematoma and three for compound depressed skull fracture.

Anatomy

There is no need here to go into a detailed discussion of the anatomy of the head and upper neck. It should be emphasized however, that the function of the neck, viewed mechanically, is to give support and mobility to the head. The latter, weighing in the adult approximately eight to ten pounds, is a relatively heavy anatomical appendage attached to the trunk by the comparatively slender neck. That such a situation does not give rise to symptoms more often is due to the admirably contrived structure of the cervical spine together with its supporting ligaments and muscles.

In this respect there are certain details which warrant closer scrutiny. The integrity and strength of the upper neck and the stability of its attachment to the skull depend to a considerable extent on a group of ingeniously arranged ligaments. These form an interlacing series of inflexible supports between the edge of the foramen magnum, the occipital condyles, the first and second cervical vertebrae and the adontoid process of the latter. Tearing or avulsion of these structures may seriously impair the stability of the head on the neck and diminish the usually accurate alignment and fit between the moving parts. In this way troublesome symptoms and complaints are brought about. It is precisely this group of ligamentous structures which must withstand the stress of excessive and abnormal flexion and rotation of the head, especially where sudden severe applications of force are involved.

History

By definition of course, the history begins with a head injury. The blow may have been severe or not and conciousness may or may not have been lost. The headache may commence within a few moments or may be delayed for several days, rarely longer. Often the headache has its onset or becomes more severe after a hospitalized patient begins to be ambulatory. This latter point is characteristic of the type of headache being discussed in this paper and tends strongly to confirm such a diagnosis.

Many times these patients will have been seen by a number of doctors, subjected to a variety of diagnostic tests and treatments but with little or no relief of symptoms. Frequently they will have been labeled neurotic and their complaints ascribed to a desire for compensation.

Symptoms

Following are listed the symptoms, with indicated frequency, that were found in this series of 200 patients.

1. Headaches 172 patients (86 per cent)
2. Neck pain 149 patients (74.5 per cent)
3. Neck stiffness 112 patients (56 per cent)
4. Dizziness 104 patients (52 per cent)
5. Tendency toward fainting or passing out spells 51 patients (25.5 per cent)
6. Shoulder, and/or back pain 48 patients (24 per cent)
7. Numbness or weakness of an arm or leg 9 patients (4.5 per cent)

The outstanding symptom was, of course, headache. This was usually localized in the occipital area on one or both sides with involvement of the adjacent upper neck. Sometimes there was a frontal or temporal component and occasionally pain at the vertex was complained of. These headaches were as a rule benefitted by bedrest and were therefore usually absent or improved on arising in the morning. After being up and about an hour or so however, the patient began to be aware of recurrence of the headache and by afternoon it had usually become severe. Another characteristic point was that any muscular effort or exertion or increased turning or twisting of the head markedly aggravated the discomfort. Exacerbation was also brought about by holding the head immobile for long periods as in reading, doing secretarial work or watching television or motion pictures. Riding or driving for several hours at a time was usually quite uncomfortable as well.

Soreness in Neck

Many, but not all of these patients admitted on questioning that there was some stiffness and soreness in the neck. They did not often volunteer such information spontaneously however, because apparently they were under the impression that this was merely a part of the headache.

In addition to the head and neck pain, there were often a number of peripheral symptoms such as dizziness and unsteadiness, nervousness, discomfort in the shoulders and upper back, and a feeling of being about to pass out or faint. These patients also remarked that when they bent over and then straightened up, there was a momentary sensation as though their head were about to explode or come off.

Physical Findings

These were usually meager because of the deeply placed location and the nature of the injured structures and also because of the presence of auxiliary ligaments and muscles which were able to function in a compensatory manner. The great majority of these patients did exhibit some limitation of the various motions of the head on the neck and complained of discomfort when such motions were passively carried out. 125 patients (62.5 per cent) in this series had such findings.

There was also very often tenderness and spasm of the muscle on one or both sides of the upper neck just below their attachment to the skull. This tenderness was usually located about three cm. lateral to the mid line, and was an almost constant finding in those patients who had neck symptoms and complaints. In this series 118 of the patients (59 per cent) had such tenderness and spasm.

On neurological examination there was some alteration in reflexes and sensation in an arm or leg, but this was very unusual, occurring only in six cases (3 per cent) in this series. Neurological changes arising from brain damage were not considered in this study.

X-ray & Electroencephalography

All of these patients had x-rays of the skull and cervical spine. In many instances there was x-ray evidence of fracture of the skull. There were only five cases, however, in which fracture of the cervical spine could be demonstrated. It is seen therefore that obvious radiological abnormalities were not frequent. The findings listed below however, were regarded as highly suggestive that neck injury had occurred.

1. Excessive mobility between any two adjacent cervical vertebrae as demonstrated on flexion and extension views.
2. Absence or reversal of the normal cervical curvature.
3. Eccentric position of the adontoid process.
4. Any degree of dislocation.

Of course such abnormalities as these may have been present previously in some cases, but unless there was good reason to think otherwise they were regarded as evidence of recent injury to the neck. In this series of patients, 55 (27.5 per cent) had one or more of the radiological findings listed above. No myelograms or cerebral air studies were done on any of the patients in this group.

Beginning in June 1954, many of these cases were subjected to electroencephalography. No correlation could be found between intensity of symptoms and electroencephalographic abnormalities.

Diagnosis

As is true of any diagnostic problem, the history, physical examination and laboratory findings were all important in establishing a diagnosis. Usually the history and physical examination strongly suggested what the cause of the symptoms might be, and the x-rays were sufficiently helpful in many cases to be worthy of routine application. The results of treatment were also used retrospectively to confirm the diagnosis and were sometimes the deciding factor in certain questionable and borderline cases. Using all the above criteria it was found that in this series, 136 patients (68 per cent) showed evidence of injury to the neck.

Treatment

During the first few months of this study, after a diagnosis of neck injury was made, the usual treatments were employed. These consisted of cervical traction, diathermy to the neck, application of a cervical collar and analgesic and relaxant medication.

These measures were sufficiently successful to justify their continued use.

Beginning in October 1953 however, injections of hydrocortisone into the upper neck were employed in resistant cases on a trial basis. These proved so satisfactory that they almost completely supplanted the other methods of therapy outlined above. Since that date, 375 injections of hydrocortisone have been given to a total of 84 patients. Out of this group 71 (84 per cent) reported moderate to marked improvement in their headaches and neck pains. Such improvement in many cases has endured to the present writing. In some instances the injections were repeated at intervals of two to twelve weeks until there was no recurrence of symptoms. In the great majority of patients the headaches, along with many of the marginal symptoms, were completely abolished; in many of these, previous treatments had been relatively unsuccessful. The only reaction encountered with the hydrocortisone was mild, temporary discomfort at the injection site.

Discussion

Post-traumatic headache and post-concussion syndrome are well described but poorly understood clinical entities. There is serious question whether or not their continued use in modern day medicine is justified. (Similarly vague clinical concepts like "rheumatism" and "lumbago" have long ago lost their status as scientific medical terminology). They do not correspond to any known pathological lesion, and, as a matter of fact, the only statement than can be made about them with certainty is that they follow trauma to the head. In addition, the phrase, post-concussion syndrome, is self contradictory in that many authorities define concussion as a completely reversible process. There should, therefore, be no sequelae.

Re-Evaluation Needed

Actually the entire matter of persistent headaches following head injury is in need of re-evaluation and revision. Many erroneous concepts are copied unchanged from one text book to another; for example, it is held by many writers that head injury is regarded with particular apprehension by the patient because he knows the tremendous importance of the brain as the organ on which thought, memory, intelligence and emotions depend. In our experience, patients whose heads have been injured are no more concerned or anxious than are those whose hands, backs, or feet have been injured.

It is true however, that *all* of these people become very worried and apprehensive when the attending physician appears unable to make a satisfactory diagnosis or to carry out successful treatment. We feel that the failure of treatment is one of the chief causes for the neurotic symptoms many of these patients exhibit and that these symptoms are a result of this situation and do not justify being represented as a primary diagnosis. Viewed in this light, the head injured patient is no different from any other, neither more nor less concerned.

Component Overlooked

Most modern textbooks completely overlook the cervical component of these injuries and stress the intracranial and psychogenic origins of the patient's symptoms. Symonds[1] in a discussion of headaches following head injuries states that "we are at a loss for a complete explanation of those (headaches) which are post-traumatic." He cites increased intracranial pressure, dilated ventricles, dural and arachnoidal adhesions and vasomotor instability as being factors in the causation of the headaches, but makes no mention of neck injury. Symmonds does note however, that the severity of the brain injury and the intensity of the subsequent symptoms usually bear no quantative relationship to one another; most authors are in agreement on this point.

Questions

Grinker and Wineberg[2] in the same book ask; "How much of this (the head injured) patient's symptomatology is due to actual damage to the brain, its coverings, or the cerebral vasomotor system and how much is a psychological reaction to the trauma or to the organic symptoms?" Again there is no mention of the neck as a possible source of the symptoms. We thus see how compartmentalised our thinking often tends to become.

Merritt[3] in his discussion of the sequelae of head injuries remarks that the headaches may not appear until the patient is ambulatory, a diagnostic point which is almost pathognomonic of headache arising from the neck. He notes that these headaches tend to recur periodically and then tend to diminish and disappear. This has been true of our experience for the most part and usually points toward an organic disorder.

Excellent Monograph

Wolff[4] in his excellent monograph on headache lays more emphasis on extracranial sources of head pain. He calls attention to the fact, frequently forgotten, that patients who have had extensive intracranial surgical procedures rarely complain of headache post-operatively. Since such operations result in almost every type of intracranial pathology that has been cited as capable of producing headaches, it seems reasonable to conclude that such pathological changes are not often the cause of post-traumatic headache. Wolff continues "it is likely that, with the exception of those headaches associated with post-traumatic subdural hematoma and subarachnoid hemhorrages, the chronic headache following trauma to the head results mainly from noxious stimuli originating in soft tissue *outside the skull.*" (italics ours).

Backs Away

After coming so close to the heart of the matter, Wolff then backs away. He declares that the "sustained contraction of skelatal muscles of the head and neck" is on the basis of "sustained resentment, anxiety, frustration and fear" thus leading us promptly back to the psychogenic theory. He does mention

scar formation and abnormal healing in the extracranial soft structures, but does not give such an explanation the emphasis it deserves.

There have from time to time appeared in the literature reports which indicate increasing interest in this problem. McLemore[5] found in his series of 147 maxillo-facial fractures, five instances of complicating fracture of the cervical spine. Since many of his patients did not receive x-ray examination of the neck, the five diagnosed cases represent a relatively large proportion of his series. The same author cites similar findings by Hilger. These reports and others like them however,[6] [7] [8] have not become disseminated through the literature and fail to come to the attention of many of those physicians who are called upon to diagnose and treat these cases.

Forces Involved

In order to appreciate the forces involved in modern day vehicular and industrial accidents, it is necessary to reconstruct as closely as possible, and to indentify the various components of the traumatogenic phase of such accidents. Since photographic records or accurate eye witness accounts are almost never available, the reconstruction must, of necessity, be hypothetical. This involves primarily an understanding of the direction of application of the forces and of their intensity. In this respect, utilization of basic physics is helpful.

Let us take for example, the individual in an automobile which is in a collision so that its forward motion comes to an abrupt halt. If this car is traveling at a rate of speed of 45 miles per hour, the passenger is thrown forward with a force equivalent to a fall from a height of 68 feet. A person in the front seat for instance strikes the dashboard — windshield area in such a way that usually the head makes first contact against the backward sloping windshield. During the succeeding fraction of a second the neck must necessarily undergo great stress and distortion as the patient's body is pressed against the uneven surfaces of the inside of the car while the head is held relatively motionless. In many cases if the automobile is whirled about or overturned, two, three or even four or more of such neck-twistings and strainings may occur. To this may be added one or two more if the patient is thrown from the car.

Violent Impact

If the vehicle is traveling at 60 miles per hour, the force of impact is equivalent to a fall from a height of 121 feet.

The same principle outlined above applies when a patient falls or when his head is struck by a heavy or rapidly moving object. In each instance, the neck is subjected briefly and at least once to a severe disruptive force, often great enough to overcome its intrinsic flexibility and strength. It is at such moments that the injury, now greater, now lesser, occurs.

That it is *this* injury which frequently gives rise to the symptoms following head trauma is strongly suggested by the findings of this study. From the resulting loss of strength, stability and to some extent alignment at the cranio-cervical attachment is derived the sustained reflex spasm of the posterior neck muscles, which in turn results in headache. This theory is supported by the effectiveness of those measures directed toward restoring the strength and diminishing the spasm of the cervico-cranial structures, such as cervical traction, cervical collar and local hydrocortisone injections. So far as is known, the hydrocortisone derives its efficacy by blocking and abolishing those changes in muscle and other tissues which lead to pain. Until more is known, of course, such treatment must remain on an empirical basis. Its success, however, justifies its continued use for the present.

Summary

A series of 200 head injured patients was studied in order to determine with what frequency concurrent neck injury had taken place.

The results appear to justify the diagnosis of cranio-cervical injury in the majority of such patients.

The relationship of neck injury to post-traumatic headache is emphasized.

The mechanism by which the neck becomes injured in these cases is discussed.

A successful treatment for headache following cranio-cervical injury is presented.

Illustrative Case Reports

Case I

This young housewife reported to my office on January 13, 1953 with chief complaint of headache and neck pain. The patient gave a history of having been injured on October 11, 1952 in a vehicular collision. She was riding in the front seat of an automobile and was just straightening up after having retrieved her keys which had fallen on the floor; just at that moment the automobile ran into a truck with such force that the patient was thrown forward through the windshield sustaining multiple lacerations and contusions about the head. Upon her release from the hospital she began to have severe headaches and these had gradually become more severe.

Neurological Examination

The neurological examination was not remarkable. The patient held her head somewhat stiffly on her neck and in a slightly bent forward position. Rotation of the head to the left was limited and resulted in considerable pain. There was tenderness over the middle of the cervical spine posteriorally, and of the upper neck bilaterally.

X-rays were made of the cervical spine and revealed greater than normal angulation at the C5—C6 level. In addition, there was an irregular forward projecting spur on the anterior inferior margin of the body of the 5th cervical vertebra which appeared to have been broken off.

This patient was given daily cervical traction in the office and was fitted with a cervical collar. She became almost asymptomatic under this regime and was released from treatment in one month. From time to time during the next year she suffered a recurrence of her symptoms which responded to a short course of traction.

Case II

This 23 year old white oilfield worker was first seen on May 18, 1953 with chief complaint of headache. The patient gave a history of having been injured on March 21, 1953 when he fell a distance of approximately thirty feet from a derrick. The patient was admitted to Medical Center Hospital in Odessa shortly thereafter and was found to have linear skull fractures in the right temporal area. He recovered quickly and was discharged on the third hospital day. He began to be bothered by headaches which became increasingly severe and failed to respond to the usual measures.

Examination

On examination there were no significant neurological findings. The head was held tilted slightly to the right with the chin somewhat deviated to the left. Rotation of the head on the neck to the left was quite painful and limited as was flexion of the head to either side.

Anterior-posterior x-rays of the upper neck were made and showed asymmetry of the atlanto-axial joint with an eccentrically placed odontoid process.

This patient was given daily treatment consisting of half hour traction to the cervical spine in a horizontal position. He rapidly improved under this program and was able to return to work shortly thereafter. When seen six months later he had remained virtually symptom free and had been able to work the entire time.

Case III

This 20 year old derrick man reported to my office on the 15th of March 1954 with chief complaint of headache. The patient gave a history of having been injured approximately six months previously while working on a drilling rig in Colorado. The injury occurred when the patient was struck heavily across the back of the head by the handle of a heavy piece of equipment. The force of the blow knocked the patient to the floor and he was unconcious for several moments. During the next few hours he began to have very severe headache with discomfort in the neck, and about four hours after the injury suddenly lost conciousness and fell to the floor. He was taken to a nearby hospital regaining conciousness about an hour later. The patient was kept in the hospital for approximately one month and received a considerable amount of cervical traction during this time. Upon being released he continued to receive treatment consisting primarily of pain medication. He continued to be bothered by severe headache and had not been free of pain since the accident.

Examination

On neurological examination the only abnormality noted was marked loss of vibratory sensation bilaterally at the ankle. Rotation and flexion of the head to either side were uncomfortable but not limited.

X-rays were within normal limits.

This patient was given an injection of 1xx. of hydrocortisone into the upper neck on each side. When seen approximately 24 hours later he had marked relief of pain and in 48 hours the discomfort was completely absent for the first time in six months. There was recurrence of headache two weeks later and the injections were repeated. Again there was complete disappearance of the pain and no further injections were necessary.

Case IV

This 41 one year old white male reported to my office on August 16, 1954 with chief complaint of headache, ringing sensation in the head. The patient was injured two weeks previously when a Butane heater blew up as he was attempting to light it. The patient was thrown backward by the explosion so that the back of his head on the right side struck a steel brace on the derrick. The patient was momentarily stunned by the blow, but did not lose conciousness. He received treatment thereafter for his symptoms without any particular relief.

Examination

Neurological examination was not remarkable. Movements of the head on the neck were painful but not limited.

X-rays were made of the cervical spine and were within normal limits. An electroencephalogram was done and was also normal.

A diagnosis was made of sprain of the upper cervical spine on the right. He was given an injection of hydrocortisone into the right upper neck with considerable relief of symptoms in 48 hours. Another injection was given two days later with complete disappearance of symptoms.

Case V

This 27 year old truck driver was seen in my office on December 31, 1954 with chief complaint of headaches. The patient gave a history of having been injured on December 17, 1954 when a heavy chain under considerable tension broke catching the patient about the head and face. He was found by the attending physician to have a fracture of the mandible and was given treatment for this. He was seen in our office because of increasingly severe headaches.

Examination

The physical examination was not remarkable except for some pain and limitation of motion of the head on the neck.

X-rays of the upper cervical spine showed marked dislocation of the adontoid process so that it was

applied closely against the left lateral mass of the first cervical vertebra.

A cervical collar was applied which the patient wore for approximately four weeks. The headache gradually improved during this time and eventually disappeared. He returned to work shortly thereafter and has been asymptomatic ever since.

Case VI

This 30 year old derrick man reported to my office on March 18, 1955 with chief complaints of headache, and dizziness. The patient gave a history of having been injured approximately three weeks before when he was struck heavily across the right forehead by a 20 foot length of two inch pipe. The patient was stunned for several moments by the force of the blow, but did not lose conciousness. The laceration of the forehead was sutured and x-rays were made of the skull and were said to have revealed no fractures. The patient returned to work a few days later but the headaches which had been present since the accident became so severe that he was unable to work for more than a few days. The pain was located in the frontal and occipital areas and was accompanied by a "blacking out" sensation, loss of vision and nausea. Bright light aggravated the headache as did straining, stooping and arising from a reclining position.

Examination

Neurological examination was within normal limits. There was some pain in motions of the head on the neck, but no limitation.

X-rays of the cervical spine revealed no significant abnormalities. An electroencephalogram was done and was within normal limits.

A diagnosis was made of sprain of the upper neck. Two injections of hydrocortisone were given into the upper neck areas bilaterally and the patient was completely symptom free in approximately five days. He returned to work shortly thereafter and has had no difficulties since.

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